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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/706,978

11/14/2003

Tatsuya Arao

0756-7219

7501

31780

7590

11/14/2005

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EXAMINER

BOOTH, RICHARD A


ART UNIT

PAPER NUMBER

2812

DATE MAILED: 11/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|-----------------------------|---|
| Office Action Summary | Application No. 10/706,978 | Applicant(s) ARAO ET AL. | |
| | Examiner Richard A. Booth | Art Unit 2812 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>0905, 0104</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 5-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Kensaku, JP 11-204433.

Kensaku shows the invention as claimed including a method for fabricating a semiconductor device comprising: forming a semiconductor film having an amorphous structure over a substrate; and irradiating the semiconductor film with an excimer laser beam in a linear or rectangular shape while applying ultrasonic vibration to the substrate to crystallize the semiconductor film (see (57) Summary in page 1 of translation).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kensaku, JP 11-204433.

Kensaku is applied as above but does not expressly disclose wherein the semiconductor device is used for a display device selected from the claimed group. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Kensaku so as to use the semiconductor device in one of the claimed display devices because it is well known to those of ordinary skill in the art that semiconductor devices are commonly used in these display devices.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kensaku, JP 11-204433 in view of Tanaka et al., US 2003/0031214 or Tanaka et al, U.S. Patent 6,927,109 or JP 2001-085354.

Kensaku et al. is applied as above but does not expressly disclose irradiating the film while holding an end portion.

Tanaka et al. '214 discloses holding an end portion of a film while irradiating using a device 119 (see fig. 4 and paragraph 0088). Alternatively, Tanaka et al. '109 also discloses holding an end portion of a film using a device 701 (see fig. 6 and col. 8-lines 20-37). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Kensaku so as to include the holding means of Tanaka et al. because in such a way the crystallization can be accurately controlled.

Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kensaku, JP 11-204433 in view of Tanaka et al, U.S. 2003/0031214.

Kensaku is applied as above but does not expressly disclose holding a substrate over a stage having pores, spouting gases from the pores to float the substrate, and holding an end portion of the substrate.

Tanaka et al. discloses holding a substrate over a stage having pores, spouting gases from the pores to float the substrate, and holding an end portion of the substrate (see, for example, paragraph 0088). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Kensaku so as to hold the substrate as disclosed by Tanaka et al. because such a method allows for adequate controlled crystallization of the semiconductor film.

Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kensaku, JP 11-204433 as applied to claim 7 above, and further in view of Chae, U.S. Patent 5,432,122.

Kensaku is applied as above but does not expressly disclose crystallizing while overlapping a beam spot of the laser beam on the film.

Chae discloses overlapping a beam spot of lasers (see abstract). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Kensaku so as to scan so as to overlap

beam spots on the film because such a method will allow for the manufacture of a high mobility transistor.

Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kensaku, JP 11-204433 in view of Tanaka et al, U.S. 2003/0031214 as applied to claims 3-4 above, and further in view of Liu et al., U.S. Patent 5,147,826.

Kensaku and Tanaka et al. are applied as above but do not expressly disclose crystallizing the semiconductor film by adding a metal element such as nickel for enhancing a crystallization.

Liu et al. discloses adding a metal element for enhancing a crystallization of a semiconductor film (see abstract and col. 4-lines 21-34). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Kensaku modified by Tanaka et al. so as to add a metal element to the semiconductor film because in such a way crystallization can be achieved at a lower temperature.

Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kensaku, JP 11-204433 in view of Chae, U.S. Patent 5,432,122 as applied to claims 11-13 above, and further in view of Liu et al., U.S. Patent 5,147,826.

Kensaku and Chae are applied as above but do not expressly disclose crystallizing the semiconductor film by adding a metal element for enhancing a crystallization.

Liu et al. discloses adding a metal element for enhancing a crystallization of a semiconductor film (see abstract and col. 4-lines 21-34). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Kensaku modified by Chae so as to add a metal element to the semiconductor film because in such a way crystallization can be achieved at a lower temperature.

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kensaku, JP 11-204433 in view of Kusumoto et al., U.S. Patent 6,027,960.

Kensaku is applied as above but does not expressly disclose irradiating the semiconductor film in an oxygen atmosphere.


Kusumoto et al. discloses laser annealing in an oxygen atmosphere (see col. 10-lines 21-26). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Kensaku so as to perform laser annealing in an oxygen atmosphere because the crystallinity will be improved.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A. Booth whose telephone number is (571) 272-1668. The examiner can normally be reached on Monday-Thursday from 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard A. Booth
Primary Examiner
Art Unit 2812

November 7, 2005